REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 3-5, 7, 8, 13, and 14 are presently active; Claim 6 is canceled and Claim 1 is amended by the present amendment. Claim 1 is amended to correct a typographical error; specifically, the language "define *a* flange" has been replaced with "define *said* flange," as originally amended in the Amendment filed January 4, 2002. The Amendment filed December 6, 2002, inadvertently changed this language to "define a flange." Accordingly, no new subject matter has been introduced by the present amendment.

In the Office Action, Claims 7, 13, and 14 were allowed, and Claims 3 and 5 were objected to as dependent upon a rejected base claim, but would be allowable if rewritten in independent form (referencing the Office Action mailed April 8, 2002, at numbered paragraph 8). Applicants note with appreciation the Examiner's indication that Claims 3, 5, 7, 13, and 14 contain allowable subject matter.

In the Office Action, Claim 6 was objected to under 37 C.F.R. 1.75 as being a substantial duplicate of Claim 4. Claims 1, 4, and 6 were rejected under 35 U.S.C. §102(b) as anticipated by Berg (U.S. Patent No. 4,758,927). Claim 8 was rejected under 35 U.S.C. §103(a) as unpatentable over Hirose et al. (U.S. Patent No. 6,122,170; hereinafter "Hirose") in view of Hiyoshi (U.S. Patent No. 6,297,549 B1).

In response to the objection to Claim 6, this claim is canceled by the present amendment. Therefore, the objection and the rejection pertaining to Claim 6 is rendered moot.

Regarding the rejection of Claim 1, 4, and 6, Applicants submit that Berg fails to anticipate these claims. For example, amended Claim 1 recites, among other features:

> ...a second conductive pattern formed on a second main surface of said substrate which is on the same side as said external heat sink and for contact with said external heat sink; and
>
> a mounting frame made of metal and having a mounting surface for contact with said external heat sink, said mounting frame including a flange along a periphery thereof for engagement with a peripheral part of said insulating substrate at said first main surface, said flange pressing said peripheral part of said insulating substrate toward said external heat sink...
>
> ...a second metal plate disposed directly on and in contact with said first metal plate and having a protrusion along a periphery thereof projecting from a periphery of said first metal plate to define said flange.[1]

Berg does not disclose the above features of amended Claim 1. Instead, Berg is directed to a method of mounting a substrate structure to a circuit board, in which a ceramic substrate 10 is positioned on a lead alignment fixture 50 with the use of a registration aid 62,[2] to which a heat sink 112 may be attached.[3] When substrate 10 is attached to fixture 50, leads 34 (of substrate 10) are brought into contact with tabs 42 and pins 52 (both of fixture 50).[4]

Registration aid 62 appears to be used only for aligning substrate 10 to fixture 50,[5] and can be actually removed after such alignment.[6] Registration aid 62 is not described to include any conductive pattern. Further, neither leads 34 nor tabs 42 contact heat sink 112, as heat sink 112 appears to be attached to rectangular portion 64 of registration aid 62.[7] Also, leads 34 are described to have outer ends project beyond tabs 42,[8] but these outer ends do not define a flange that presses a peripheral part of substrate 10 toward heat sink 112.

In contrast to Berg, Claim 1 recites a second conductive pattern formed on a second main surface of an insulating substrate, a mounting frame having a mounting surface for contact with an external heat sink, and a second metal plate having a protrusion projecting from a periphery of a first metal place to define a flange that presses a peripheral part of an

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[1] Specification at amended Claim 1, lines 5-12 and 15-17.
[2] Berg at Figures 1 and 2, and at col. 4, lines 17-44.
[3] *Id.* at Figure 5, and at col. 6, lines 11-19.
[4] *Id.* at col. 4, lines 2-26.
[5] *Id.* at col. 4, lines 27-55.
[6] *Id.* at col. 4, lines 55-60.
[7] *Id.* at Figure 5.

insulating substrate toward an external heat sink. Berg does not disclose any of these features. Rather, in Berg, registration aid 62 does not include any conductive pattern, leads 34 and tabs 42 do not contact heat sink 112, and leads 34 and tabs 42 do not form a flange that presses substrate 10 against heat sink 112. As Berg does not disclose each and every feature of amended Claim 1, Berg fails to anticipate amended Claim 1.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of Claim 1 under 35 U.S.C. §102(b). Claims 3-5 depend from Claim 1 and are patentable over Berg at least for the reasons discussed above.

Regarding the rejection of Claim 8, Applicants respectfully submit that this claim is not taught or suggested by Hirose and Hiyoshi in combination. Claim 8 recites, among other features:

> ...wherein said substrate, said first conductive pattern and said second conductive pattern of said insulating substrate have respective peripheries in alignment with each other; and
>
> wherein said flange presses said periphery of said first conductive pattern on which a semiconductor element is mounted toward said external heat sink, with an insulative material between said flange and said first conductive pattern.[9]

Hirose and Hiyoshi do not teach or suggest such features, either individually or in combination.

Hirose is directed to a power module board including a heat radiating plate 5, a ceramic base plate 1, a prescribed metal layer 2, a prescribed metal layer 11, and a conductive layer 8.[10] Conductive layer 8 and metal layer 2 are formed on one side of base plate 1, while prescribed metal layer 11 is formed on an opposite side of base plate 1.[11] Base plate 1 is

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[8] *Id.* at Figure 2, and at col. 4, lines 15 and 16.
[9] Specification at Claim 8, lines 13-17.
[10] Hirose at Figure 16B, at col. 6, lines 20-46, and at col. 7, lines 43-49.
[11] *Id.* at Figure 16B.

fixed on heat radiating plate 5 by a fixing jig 3, which directly contacts heat radiating plate 5, metal layer 2, base plate 1, and metal layer 11.[12]

In Hirose, conductive layer 8 (which the Office Action corresponds to the "first conductive pattern" in Claim 8) does not have a periphery aligned with the peripheries of prescribed metal layer 11 and base plate 1. Instead, metal layer 2 has a periphery aligned with the peripheries of prescribed metal layer 11 and base plate 1. Although metal layer 2 and conductive layer 8 can be formed simultaneously,[13] these elements are used for different purposes (i.e., metal layer 2 for use as a buffer layer, and conductive layer 8 for receiving chip components). Also, fixing jig 3 does not press a periphery of conductive layer 8 toward heat radiating plate 5; in fact, fixing jig 3 does not contact conductive layer 8 at all.[14] Further, as recognized in the Office Action, Hirose fails to disclose "an insulative material between the flange and the first conductive pattern," as recited in Claim 8.

In contrast to Hirose, Claim 8 recites first and second conductive patterns having respective peripheries in alignment with each other, a flange pressing the periphery of the first conductive pattern toward an external heat sink, and an insulative material between the flange and the first conductive pattern. Hirose does not teach or suggest any of these features. Instead, in Hirose, metal layer 2, which would not be regarded as a conductive pattern by an ordinarily-skilled artisan, has a periphery aligned with a periphery of metal layer 11 and is pressed by fixing jig 3 toward heat radiating plate 5. Conductive layer 8 is not so arranged. Also, Hirose is silent as to an insulative material disposed between a flange and a first conductive pattern. As such, Hirose fails to teach or suggest Claim 8.

[12] *Id.* at Figure 16B, and at col. 6, lines 39-46.
[13] *Id.* at col. 6, lines 47-51.
[14] *Id.* at Figure 16B.

To remedy the deficiencies of Hirose with respect to Claim 8, the Office Action turns to the teachings of Hiyoshi, which is directed to a semiconductor power module that includes sealing members 53 positioned between a flange 51 and a heat sink 60.[15]

However, in Hiyoshi, sealing members 53 are used to provide a hermetic seal, not to insulate a first conductive pattern from a flange, as recited in Claim 8. Hiyoshi is completely silent to the concept of sealing members 53 acting in an insulative manner, particularly in the environment of semiconductors. As such, Hiyoshi does not disclose an insulative material between a flange and a first conductive pattern, as recited in Claim 8, and does not remedy the deficiency of Hirose with regard to this feature.

Further, Hiyoshi does not disclose first and second conductive patterns having respective peripheries in alignment with each other, and a flange pressing the periphery of the first conductive pattern toward an external heat sink, as recited in Claim 8. As such, Hiyoshi fails to remedy the deficiencies of Hirose with regard to these features.

Moreover, it would not have been obvious to one of ordinary skill in the art to combine the teachings of Hirose and Hiyoshi at the time of Applicants' invention. In Hirose, fixing rig 3 does not even contact conductive layer 8,[16] and as a result an ordinarily-skilled artisan familiar with Hirose would not have recognized any need to electrically insulate conductive layer 8 from fixing rig 3. Also, as metal layer 2 simply acts as a buffer layer for fixing purposes, there would have been no need to insulate metal layer 2 from fixing rig 3. Therefore, there would have been no motivation for an ordinarily-skilled artisan familiar with Hirose to look to the teachings of Hiyoshi for the purpose of insulating conductive layer 8 from fixing rig 3. Hiyoshi certainly provides no such motivation, as Hiyoshi does not even disclose an insulative material as recited in Claim 8, as discussed above.

[15] Hiyoshi at Figure 4, and at col. 11, lines 45-50.
[16] Hirose at Figures 1 and 16B.

Accordingly, Claim 8 is patentable over Hirose and Hiyoshi, taken either individually or in combination. As such, Applicants respectfully request reconsideration and withdrawal of the rejection of Claim 8 under 35 U.S.C. §103(a).

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER AND NEUSTADT, P.C.

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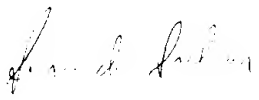

Gregory J. Maier
Registration No. 25,599
Surinder Sachar
Registration No.34,423
Attorneys of Record

(703) 413-3000
Fax: (703) 412-2220

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